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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/562,602	12/28/2005	John R Briggs	62213A	3678
35503	7590	08/30/2007		
UNION CARBIDE CHEMICALS AND PLASTICS TECHNOLOGY CORPORATION P.O. BOX 1967 MIDLAND, MI 48641-1967			EXAMINER WITHERSPOON, SIKARL A	
			ART UNIT 1621	PAPER NUMBER
			MAIL DATE 08/30/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary**

Application No.

10/562,602

Applicant(s)

BRIGGS ET AL.

Examiner

Sikarl A. Witherspoon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 July 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,4,5,7,8,11-13,15,16,19-23,25-28,30,33 and 34 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 13,22,23,25-28,30,33 and 34 is/are allowed.
- 6) ☒ Claim(s) 1,4,5,7,8,11,12,15,16, and 19-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

The examiner has considered applicants' amendment filed July 20, 2007 and the arguments therein. Applicants' arguments were not found persuasive, and as such, the following rejections have been maintained.

#### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 8, 11, 12, and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by packet et al (US 5,886,237).

Packett et al disclose a carbonylation process wherein in butadiene is reacted with carbon monoxide and hydrogen to produce the corresponding alkenal, employing a rhodium complex as catalyst and tris(2-cyanoethyl) phosphine as ligand (col. 55, line 65 to col. 56, line 12). The reaction temperature is 110° C, and the ligand has a pKa of about 1.37. Packett et al do not expressly disclose a method of minimizing the production of phosphonium ion degradation products, as per the instant claims; however, since all of the reaction parameters of the instant claims are disclosed by Packett et al, the reaction disclosed by Packett must inherently minimize the production of these degradation products; *ex parte Novitski*, 26 USPQ2d 1389 (BPAI, 1993). Accordingly, Packett et al anticipate the instant claims.

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***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4, 5, 16, and 19-21, although not anticipated, are rejected under 35 U.S.C. 103(a) as being unpatentable over Packett et al.

The instant claims further limit the process of the invention to an olefin conversion of between about 80 and 95 weight percent, a reaction temperature of greater than 45° C and less than 95° C.

Packett et al teach a butadiene conversion of about 68% by weight, and a process temperature of 110° C; the pressure is 1000 psig (col. 56, lines 5-9).

However, the examiner takes the position that it would have been obvious to a person having ordinary skill in the art, at the time the present invention was made, to modify process conditions such as temperature and/or pressure, in order to control the level of conversion of the polyolefin and/or selectivity to the desired alkenal.

Claims 1, 4, 5, 7, 8, 11, 12, 15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Guram et al (US 6,034,286).

Guram et al teach a carbonylation process wherein a conjugated diene, such as 1,3-butadiene is reacted with carbon monoxide and hydrogen in the presence of a rhodium complex and a phosphine ligand. The reaction is conducted at about 80° C;

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table A lists ligands employed in the reaction; examples 1,2, and 4-10 employ ligands having a pKa of less than 8.3 (col. 8, lines 25-42; col. 21, line 55 to col. 22, lines 25).

The olefin conversion ranges from 62 to 93 weight percent.

The primary differences between Guram et al and the instant claims are first, that Guram does not expressly teach a method of minimizing the production of phosphonium ion degradation products, as per the instant claims; however, since all of the reaction parameters of the instant claims are disclosed by Guram et al, the reaction taught by Guram et al would also produce the effect of minimizing the production of these degradation products.

Second, Guram et al are drawn to the production of alcohols, not unsaturated aldehydes that are the primary product formed in the process of the present invention.

However, the examiner takes the position that since the reaction taught by Guram et al begin with a 1/1 hydrogen/carbon monoxide ratio before increasing to a 3/1 ratio (see col. 21, lines 61-65), it would have been obvious to a person of ordinary skill in the art that unsaturated aldehydes corresponding to the olefinic starting material, i.e., butadiene, are present in the reaction mixture prior to increasing the hydrogen concentration of the reaction effluent. If so desired, a person having ordinary skill in the art could have stopped the reaction after the initial conversion of butadiene in order to isolate pentenals, which are themselves valuable intermediates.

The following is a statement of reasons for the indication of allowable subject matter: claims 22, 23, 25-28, 30, 33 and 34 are drawn to a process for reverting a

phosphonium ion ligand degradation product back to useful triorganophosphine ligands that are not taught or fairly suggested by the prior art.

### ***Response to Arguments***

Applicant's arguments filed July 20, 2007 have been fully considered but they are not persuasive. Regarding the rejection under 102(b), the thrust of applicants' argument while some of the ligands disclosed by Packett et al (102 reference) may meet the criteria of the instant invention, none of said ligands are identified by Packette et al as being "special", and, that the Packett et al reference nowhere recognizes the problem associated with consumption of triorganophosphine ligands through formation of phosphonium ion degradation products.

The examiner does not disagree with applicants' assertion that Packette et al does not mention phosphonium ion degradation products nor allude to a means of minimizing these degradation products by using triorganophosphine ligands having a specific cone angle or pKa as per the instant invention. However, as stated by the examiner in the rejection, and concurred to by applicants, Packette et al *do* teach ligands that absolutely meet the criteria of the ligands recited in the instant claims. As also stated by the examiner, Packette et al disclose a process that includes all of the positive method steps described in the instant claims. Therefore, the examiner asserts that the reaction disclosed by Packett *must* inherently minimize the production of these degradation products. The fact that Packett et al do not mention any problems associated with phosphonium ion degradation products or any means of addressing

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such a problem is the very reason that the anticipatory rejection is based on inherency. The examiner would like to direct applicants' attention to *ex parte Novitski*, 26 USPQ2d 1389 (BPAI, 1993).

Regarding the rejection(s) of record under 103(a), applicants' arguments are of a similar thrust as to the 102 rejection regarding the lack of teaching of any problems associated with phosphonium ion degradation products or any means of addressing such a problem, again in Packett et al, and in Guram et al, the other reference relied upon for a 103 rejection of record. To these arguments, the examiner's rebuttal is of similar scope as the rebuttal to the arguments per the rejection under 102(b). The examiner would, however like to strike the use of the word "inherent" as it pertains to the rejection under 103. Instead, the examiner has asserted that since all of the reaction parameters, i.e., positive reaction steps, of the instant claims are disclosed by Guram et al, the reaction taught by Guram et al would also produce the effect of minimizing the production of these degradation products.

Applicants' arguments regarding optimization of reaction conditions are not found persuasive. Absent a showing of *unexpected* results, the examiner stands by the assertion that it would have been obvious to a person having ordinary skill in the art, at the time the present invention was made, to modify process conditions such as temperature and/or pressure, in order to control the level of conversion of the polyolefin and/or selectivity to the desired alkenal.

Finally, applicants' argument regarding whether or not a person of ordinary skill would arrive at the instant invention from Guram et al is also not persuasive. Guram et

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al may ultimately be drawn to the production of an alcohol, but the reactants are the same as those in the instant claims, many of the possible ligands usable by Guram et al do indeed meet the criteria of the ligands recited in the instant claims, the reaction temperatures overlap those of the instant claims. Therefore, since there are differences between Guram et al and the instant claims, the examiner made an obviousness rejection of Guram et al and not an anticipatory one. Absent a showing or teaching to the contrary, the examiner asserts that given the same type of reaction, the same type of reactants, i.e., unsaturated compounds as starting material, triorganophosphine ligand, reaction temperature, etc., the examiner contends that while silent in this regard, Guram et al teaches a process that effectively affords a reduction in the formation of phosphonium ion degradation products.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.



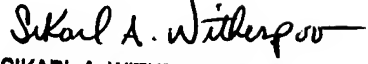
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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sikarl A. Witherspoon whose telephone number is 571-272-0649. The examiner can normally be reached on M-F 8:30-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yvonne Eyler can be reached on 571-272-0871. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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SIKARL A. WITHERSPOON  
PRIMARY EXAMINER